

- 24 -

Claims:

1. Copolymer composed of

(a) at least one monomer from the group of acrylates, methacrylates, acrylamides and methacrylamides, to each of which is bonded covalently, directly or via a bridging group, a photochemically isomerizable or dimerizable molecule,

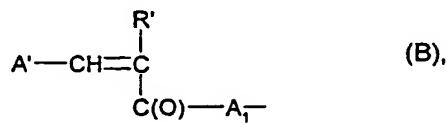
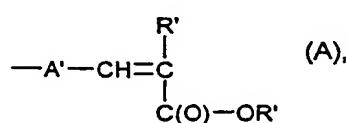
(b) at least one comonomer containing hydroxyl groups, and

(c) optionally, other ethylenically unsaturated comonomers,

characterized in that the comonomer (b) is a polyoxyalkyl ester or a polyoxyalkylamide of an ethylenically unsaturated mono- or dicarboxylic acid, or a polyoxyalkyl ether of an ethylenically unsaturated alcohol, and the hydroxyl group of the polyoxyalkylene radical may be etherified or esterified.

2. Copolymer according to Claim 1, characterized in that the photochemically isomerizable group of component a) is an ethylenically unsaturated group which is bonded to a carbocyclic or heterocyclic, aromatic ring.

3. Copolymer according to Claim 2, characterized in that the photopolymerizable group corresponds to the formulae A or B



where

R' is hydrogen or C₁-C₄-alkyl,

A' is an optionally substituted mono- or divalent aromatic radical or an optionally substituted mono- or divalent heteroaromatic radical, and

A₁ is a bridging group.

- 25 -

4. Copolymer according to Claim 1, characterized in that the monomers (a) correspond to the formula I or to the formula Ia



where

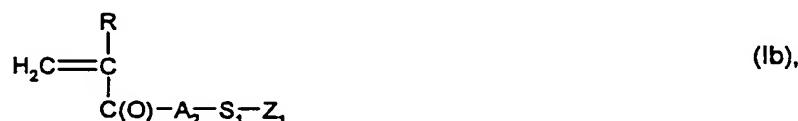
R is H or C₁-C₈-alkyl,

A is a bridging group,

S₁ is an optionally substituted divalent, and S₂ an optionally substituted monovalent, aromatic or heteroaromatic radical, and

Z₁ is a monovalent, and Z₂ a divalent, radical of a molecule which isomerizes or dimerizes photochemically.

5. Copolymer according to Claim 1, characterized in that the monomers (a) correspond to the formula Ib or to the formula Ic,



where

R is hydrogen or methyl,

A₂ is a bivalent radical of the formula -O-C_nH_{2n}-X₁-,

A₃ is a bivalent radical of the formula -O-C_nH_{2n}-O-,

n is a number from 2 to 18 and preferably from 4 to 16,

X₁ is a direct bond or an -O-, -S-, -C(O)O-, -O(O)C-, -OC(O)O-, -NH-,

- 26 -

-NC₁-C₄-alkyl-, -NHC(O)-, -C(O)NH-, -NHC(O)NH-, -NC₁-C₄-alkyl-C(O)-, -C(O)-NC₁-C₄-alkyl-, -NC₁-C₄-alkyl-C(O)-NC₁-C₄-alkyl-, -O(CO)NH-, -OC(O)-NC₁-C₄-alkyl-, -NHC(O)O- or -NC₁-C₄-alkyl-C(O)O- group,

S₁, where present, is phenylene, biphenylene or -C₆H₄-X₂-C₆H₄-,

S₂, where present, is substituted phenyl, biphenyl or -C₆H₄-X₂-C₆H₅,

X₂ is -O-, -S-, -C(O)O-, -O(O)C-, -OC(O)O-, -NH-, -NC₁-C₄-alkyl-, -NHC(O)-, -C(O)NH-,

-NHC(O)NH-, -NC₁-C₄-alkyl-C(O)-, -C(O)-NC₁-C₄-alkyl-, -NC₁-C₄-alkyl-C(O)-NC₁-C₄-alkyl-,

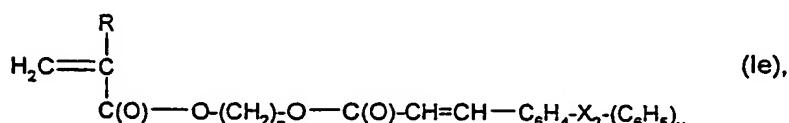
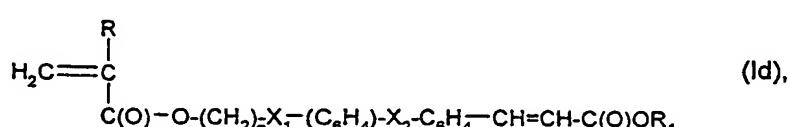
-O(CO)NH-, -OC(O)-NC₁-C₄-alkyl-, -NHC(O)O- or -NC₁-C₄-alkyl-C(O)O-,

Z₁ is a radical of the formula -CH=CH-C(O)-OR₁,

Z₂ is a radical of the formula -CH=CH-C(O)-, and

R₁ is C₁-C₁₈-alkyl, more preferably C₁-C₁₂-alkyl, and especially preferably C₁-C₄-alkyl.

6. Copolymer according to Claim 1, characterized in that the monomers (a) correspond to the formula Id or to the formula Ie



where

R is methyl,

n is a number from 2 to 20, preferably from 4 to 14,

R₁ is C₁-C₄-alkyl and preferably methyl,

x is 0 or 1,

X₂ is a direct bond, -O-, -S-, -CO-, -OC(O)- or -C(O)O-, and

the C₆H₄ and C₆H₅ groups are each independently unsubstituted or substituted by 1 to 3 C₁-C₄-alkyl and/or C₁-C₄-alkoxy, preferably methoxy.

7. Copolymer according to Claim 1, characterized in that the comonomers (b) correspond to the formula II,

- 27 -



where

R is H or C₁-C₄-alkyl,

R₂ is H or -COOR₅,

R₃ is C₂-C₆-alkylene,

R₄ is H, -R₆- or R₆-C(O)-,

B is methylene or -C(O)-,

q is 0 or 1,

n is a number from 2 to 200,

R₅ is H, C₁-C₂₀-alkyl, phenyl, phenyl-C₁-C₆-alkyl or C₁-C₁₈-alkylphenyl, and

R₆ is C₁-C₂₀-alkyl, phenyl, phenyl-C₁-C₆-alkyl, or C₁-C₁₈-alkylphenyl, or, in the R₆-C(O)-group, is additionally C₂-C₁₈-alkenyl or phenyl-C₂-C₆-alkenyl.

8. Copolymer according to Claim 7, characterized in that R is H or methyl.

9. Copolymer according to Claim 7, characterized in that R₂ is H.

10. Copolymer according to Claim 7, characterized in that R₃ is ethylene or 1,2-propylene or mixtures of these radicals.

11. Copolymer according to Claim 7, characterized in that R₄ is preferably H, C₁-C₁₂-alkyl or C₁-C₁₂-alkyl-C(O)-.

12. Copolymer according to Claim 7, characterized in that B is -C(O)-.

13. Copolymer according to Claim 7, characterized in that the index n is a number from 2 to 100.

14. Copolymer according to Claim 7, characterized in that the comonomers of the formula II are acrylic or methacrylic monoesters of polyethylene glycols or polypropylene 1,2-glycols having on average 2 to 20 oxyethylene or oxypropylene units.

- 28 -

15. Copolymer according to Claim 1, characterized in that the monomers (c) are unsubstituted or substituted olefins or diolefins.
16. Copolymer according to Claim 15, characterized in that the comonomer (c) is ethene, propene, butene, pentene, styrene, vinyl chloride, vinylidene chloride, (meth)acrylonitrile, (meth)acrylamide, N-alkylated or N-hydroxyalkylated (meth)acrylamide, alkyl (meth)acrylates and hydroxyalkyl (meth)acrylates having 1 to 20 carbon atoms in the ester group, vinyl and allyl esters, and also vinyl and allyl ethers, having 1 to 20 carbon atoms in the ester or ether groups.
17. Copolymer according to Claim 1, characterized in that it additionally contains radicals of monomers having at least two ethylenically unsaturated groups.
18. Copolymer according to Claim 1, characterized in that some or all of the hydroxyl groups of the polyoxyalkyl radicals of the comonomers (b) have been esterified with radicals of ethylenically unsaturated monocarboxylic acids.
19. Copolymer according to Claim 18, characterized in that the monocarboxylic acid is acrylic acid or methacrylic acid.
20. Copolymer according to Claim 1, characterized in that the glass transition temperature is at most 70°C.
21. Copolymer according to Claim 20, characterized in that the copolymers have a glass transition temperature of at most 50°C.
22. Copolymer according to Claim 1, characterized in that 10 to 95% by weight of comonomer (a), and 90 to 5% by weight of comonomer (b) are present, based on the copolymer.
23. Copolymer according to Claim 1, characterized in that the comonomer (c) replaces 50 to 1% by weight of the comonomer (b).

- 29 -



24. Coating composition comprising, in an organic solvent, a copolymer composed of
(a) at least one monomer from the group of acrylates, methacrylates, acrylamides and
methacrylamides, to each of which is bonded covalently, directly or via a bridging group,
a photochemically isomerizable or dimerizable molecule,
(b) at least one comonomer containing hydroxyl groups, and
(c) optionally, other ethylenically unsaturated comonomers,
characterized in that the comonomer (b) is a polyoxyalkyl ester or a polyoxyalkylamide of an
ethylenically unsaturated mono- or dicarboxylic acid, or a polyoxyalkyl ether of an
ethylenically unsaturated alcohol, and the hydroxyl group of the polyoxyalkylene radical may
be etherified or esterified.

25. Polymerizable composition comprising

(a) at least one monomer from the group of acrylates, methacrylates, acrylamides and
methacrylamides, to each of which is bonded covalently, directly or via a bridging group,
a photochemically isomerizable or dimerizable molecule,
(b) at least one copolymerizable comonomer containing hydroxyl groups,
(c) optionally, other ethylenically unsaturated comonomers,
(d) a polymerization initiator, and
(e) optionally, an inert solvent,
characterized in that the comonomer (b) is a polyoxyalkyl ester or a polyoxyalkylamide of an
ethylenically unsaturated mono- or dicarboxylic acid, or a polyoxyalkyl ether of an
ethylenically unsaturated alcohol.

26. Composite material composed of a backing and a thin layer of a polymerizable
composition or a thin layer of a copolymer of this composition, comprising

(a) at least one monomer from the group of acrylates, methacrylates, acrylamides and
methacrylamides, to each of which is bonded covalently, directly or via a bridging group,
a photochemically isomerizable or dimerizable molecule,
(b) at least one copolymerizable comonomer containing hydroxyl groups,
(c) optionally, other ethylenically unsaturated comonomers, and
(d) a polymerization initiator,
characterized in that the comonomer (b) is a polyoxyalkyl ester or a polyoxyalkylamide of an
ethylenically unsaturated mono- or dicarboxylic acid, or a polyoxyalkyl ether of an
ethylenically unsaturated alcohol.